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or nearly 5" by chronometer, exists between the longitudinal positions of Mount Hamilton, as determined from the two surveys; as the discrepancy is one of absolute distance, it does not affect the value of either survey. The desirability of having a check on the chronometrical determination of the longitudes of meridians was kept in view during the survey by carrying on, with as much care as possible under the circumstances, a triangulation based on short lines. After plotting the work to the scale of one-half inch to the mile, it is satisfactory to state, considering the rugged nature of the country, that the difference between the chain and chronometrical measurements of the distance between Lindis Peak and Mount York was not appreciable; the meridian of Mount Nicholas when brought to the same test, shows a difference of $2\frac{1}{2}$ " by chronometer.

To check the altitudes, several peaks were determined, both from the data of Mount Pisa and from the data of the Bluff. The nearest agreement of the two determinations was that of Earnslaw, the difference being only 2 feet. The greatest disparity was in the two determinations of Mount Nicholas, the difference being 107 feet. The angular measurements of the survey were all made (with the exception of the astronomical observations), by a 4-inch Everest theodolite. Throughout the survey, an equal attention was given to the details of each district; so that unnecessary minuteness was not obtained in one part at the expense of vagueness in another.

V.—*An Exploration up the Moisie River, to the Edge of the Table-land of the Labrador Peninsula.* By HENRY YOULE
HIND, M.A., F.R.G.S., Trinity College, Toronto.

Read, January 25, 1864.

THE Moisie River has for centuries been the canoe-route of the Montagnais tribe of Indians from the Gulf of St. Lawrence to the interior of the Labrador peninsula; and within the last fifteen years this river has formed the route by which a few families of the Nasquapee Indians, whose hunting-grounds lie on the table-land, have reached the gulf. The mouth of the Moisie is about 18 miles east of the well-known Bay of Seven Islands; and, as the general direction of its course is very nearly due north, it forms, probably, the shortest route by which the table-land can be reached from this part of the gulf. It has also this advantage, that the north-east branch is separated by a very low water-parting from the head-waters of the Ashwanipi, or Hamilton River, the great river of the table-land, which, after a course of about 400 miles, empties into Hamilton Inlet, and forms an inland canoe-route, in



conjunction with the Moisie, between the ancient rendezvous of the Montagnais, Seven Islands, and Hamilton Inlet. I have every reason to believe that this route is one of great antiquity, judging from the condition of the portage-paths, the numerous remains of lodge-poles, stones for the vapour-bath, and old camping-grounds, which were seen as far north as $51^{\circ} 40'$, or close to the edge of the table-land, and within sight of the dividing ridge and the sources of the Ashwanipi River.

The distinguishing features of the scenery on the Moisie are its rapids, falls, and impetuous currents; the deep gorges through which it occasionally flows, the precipitous rocks limiting the lower part of its valley, and the frozen streams descending from their summits, which, when the accumulated ice gives way in the summer months, brings with it masses of rock, and sweeps every yielding thing in its downward course, like an avalanche, to the valley below.

Forty-five miles from the mouth of the river the current becomes too strong for canoes, being, in fact, a continuous rapid, and the canoe-route diverges to a small tributary between the west and the north-east branches. There is no apparent difference in the volume of water carried by either branch of the Moisie just above their point of junction and where they meet. The river is about 150 yards broad in June.

Coldwater River is the name of the small tributary which forms the canoe-route for the next 25 miles, before the north-east branch of the Moisie is struck. Some conception of the character of the country through which the river flows in the short space of 25 miles may be gleaned from the fact that Trout Lake, the source of Coldwater River, which also sends water to the north-east branch, 6 miles off, in a northerly direction, has a fall of nearly 1500 feet.

After reaching the north-east branch, 70 miles from the sea, and 1300 feet above it, the Moisie flows through a comparatively level lake country for a distance of 30 miles. Innumerable boulders lie scattered over the hill-sides and in the valley of the river throughout the whole of this level portion of the Moisie valley. The rocks are covered with the richest profusion of mosses and lichens. Nothing of its kind can exceed the marvellous beauty of these humble vegetable forms in the "boulder" country. Where the lichens have been burned by the spread of fire, owing to the carelessness of Indians, the boulders are seen to lie in tiers, three, and even four deep, their dimensions varying from 5 to 20 feet in diameter. About 95 miles from the gulf, in a straight line, another rise takes place in the general surface of the country, which continues, with a gentle slope, to the table-land. The height of the portage forming the southern limit of

this step is 1850 feet above the sea-level; and the summit of a dome-shaped rock which overlooked the dividing ridge 15 miles further north, was found to be a little more than 2200 feet above the sea-level, which is about the altitude of the sources of the Ashwanipi or Hamilton River on the table-land. The course of the Ashwanipi lies roughly parallel to the north shore of the gulf, according to the Indians, who make it their canoe-route to the Hudson Bay Company's post at Petshikupau, and thence to Hamilton Inlet.

The chief mountain-range through which the different branches of the Moisie find their way, was estimated to have an altitude of about 3000 feet above the sea. The portage-path in the gorge through which Coldwater River flows, was found to be 1460 feet above the same level. The general direction of this range is roughly parallel to the north shore of the gulf, having an easterly and westerly trend; and the three branches of the Moisie flow in deep gorges cut through it nearly at right angles to its axis, which, according to the statement of Indians, is prolonged far to the east and west.

The sources of the Magpie River, which enters the gulf 65 miles east of the Moisie, can be distinguished from the head-waters of the north-east branch, and the peaks of the Mingan Mountains were just discernible in the eastern horizon from the same point of view.

The Mingan Mountains lie at the head-waters of the Mingan River, one of the largest tributaries to the gulf, next to the Moisie, on the southern slope of the Labrador peninsula.

Far to the north-east a series of snow-capped peaks were seen, distant two days' journey in snow-shoes (about 60 miles); but, with this exception, the whole horizon to the north and north-west was bounded by a low undulating outline, rarely rising above the point of view. To the south, the distant peaks of the "Top of the Ridge Range" was visible, from which the Indians told us ships in the gulf, and the sources of the Ashwanipi River, could be discerned on a clear day in the summer months.*

* The Ashwanipi or Hamilton River has been described as far as Petshikupau by gentlemen in the service of the Hudson Bay Company, [Mr. M'Lean, 'Notes of a Twenty-Five Years' Service in the Hudson Bay Company.']. Petshikupau of the Nasquapees is the now abandoned post, "Fort Nascopee," and a description of the river from this point to Hamilton Inlet has been given by Mr. M'Lean, who descended it in 1839.

Several papers have been read before the Literary and Historical Society of Quebec on different parts of the Labrador Peninsula, and are published in the earlier volumes of their Transactions (1842), and an interesting account of the Mistassinni country north of the Sanguenay River was published in 1861 from the manuscript notes of the celebrated botanist André Michaux, who journeyed from the Gulf of St. Lawrence to Rupert's, Hudson's Bay, in 1782, following the track of the Jesuit missionary Père Albanel and his companions in 1672. [For a brief

The extensive conflagrations which have swept over a very considerable portion of the peninsula, have been the chief cause of the diminution in the numbers of the Indians, who once hunted in the midst of an abundance of animal life, to which former forests gave shelter.

From the summit of a hill near the head of Lake Nipisis, I had a fine opportunity of witnessing the desolation produced by these conflagrations. Towards the east a succession of lakes, studded with islands, lay in the valleys leading into the one partially occupied by Lake Nipisis; and an illimitable forest, with bare rocks rising out of it, was bounded only by the horizon in that direction; but north and north-west, as far as the eye could reach, lay a black and gloomy country, over which fire had passed many years ago. Myriads of boulders were strewed over the hills and in the valleys; and, weathering white, they formed a prominent feature in the black desert the fire had occasioned.

The rocks observed in the valley of the Moisie River belong to the Upper and Lower Divisions of what was formerly described by Sir William Logan as the Laurentian Series of Canada, but since divided by that distinguished geologist into two divisions, the Upper, termed provisionally the Labrador Series, and the Lower, or Laurentian Proper. Labrador rocks were first recognised at the mouth of Coldwater River, and it is probable that the mountain region of the "Top of the Ridge Range," extending from the mouth of Coldwater River to Trout Lake, is made up of the rocks of this series.

The entire aspect of this region leads to the supposition that it has been moulded by the action of ice, and the valleys in which the rivers flow are probably those of ancient glaciers. The descriptions given by the few who have penetrated far into the interior of this country, tend to confirm the impression that it is a boulder-covered country from Lake Mistassinni to Ungava Bay, at all levels higher than 800 or 1000 feet above the sea.

The most remarkable forms which vegetable life assumes on the Moisie, are those of mosses and lichens. Among the latter the "caribou moss," as it is termed (*Cladonia rangiferina*), is the most widely distributed, and is probably the most important, as constituting the chief food of the reindeer, or caribou. It is however, remarkable that this lichen was more frequently observed on the gneiss of the Laurentian Series, than on Labradorite rocks; while on the other hand, the presence of a luxuriant forest of spruces and white birch always indicated the proximity of rocks

account of these descriptions of different parts of Labrador Peninsula, see 'Explorations in the Interior of the Labrador Peninsula,' by the author. Longmans, 1863.]

of the lime-felspar series. Large white birches, 18 inches in diameter, and white spruce of the same dimensions, and from 40 to 50 feet and more in altitude, were seen clothing the hill-sides of the valley of the north-east branch, at Bear Lake, about 90 miles from the gulf. A land-slide close at hand showed the rock to consist of a granitoid gneiss, probably a member of the Labrador Series.

The tripe de roche (*Stictia pulmonaria*) is also everywhere abundant, and is sometimes used, with the buds of the birch-tree, as an article of food by the Indians in times of scarcity. The Labrador tea-plant (*Ledum palustre*) was found growing everywhere after passing Coldwater River portage. On the portages the larch, the white birch, and the white spruce, were seen to grow wherever they could find nourishment, by sending their roots into fissures in the rocks; but in such an unkindly soil they rarely reached an altitude of more than 20 feet, and it was only in the valleys or on the sloping sides of the Labradorite rocks that they acquired the dimensions already given. In the valley of Coldwater River, near its mouth, where gigantic land-slides of Labradorite had occurred and where occasionally the iridescent colours characteristic of certain varieties of this rock were seen, the forest growth was very luxuriant, and would have been no discredit to a more genial clime.

This now desolate country was formerly peopled with numerous bands of Montagnais tribes on the flanks of the table-land, and by a kindred tribe, the Nasquapees, whose hunting-grounds lay on the table-land itself. These tribes speak dialects of the Cree language; and among the Nasquapees who have not lost the ancient customs and habits of their forefathers by contact with white men, many peculiarities observable among the prairie tribes on the Saskatchewan, are recognised as practised by them. A peculiarity in the form of their stone pipes is worth remarking; and, by comparing the pipes of the Plain Crees, whose hunting-grounds lie on the south branch of the Saskatchewan, with those of the Blackfeet and the Nasquapees, a marked similarity will be noticed. A similar distinctive form of pipe belongs to the Ojibways, of Rainy Lake (the Lake of the Woods) and the Swampies, of Lake Winnipeg, who also speak the Ojibway language; and a third characteristic form of pipe distinguishes the Chipewyans, whose hunting-grounds lie to the north of the Great Cree nation.

The Nasquapees live in skin tents, like the Crees of the great Western plains. They also smoke the roasted leaves of the bear-berry, the red-barked willow (*Cornus sericeus*), and another willow common on the borders of lakes. The people of this tribe are tattooed to a small extent. Short parallel lines are cut from the cheek-bone to the nostril, and the markings are made permanent

by rubbing charcoal or some colouring substance into the wound. The hunting-grounds of this people extend from Mistassinni Lake to the Atlantic coast of the Labrador peninsula; and there exist traditions among both Nasquapees and Montagnais, of former battles with the Iriquois, or Mohawks, near Trout Lake, at the source of Coldwater River, which must have occurred more than two centuries ago. Their conflicts with the Esquimaux have continued down to a very late period. When we take into consideration the great jealousy with which the Indian races of the American continent, speaking different languages, regard the invasion of their territory, or hunting-grounds, the vast extent of surface over which the Cree nation has established itself, cannot fail to possess great interest to the ethnological inquirer. The hunting-grounds of the Cree nation extend from the foot of the Rocky Mountains to the Atlantic coast of Labrador, a distance exceeding 2500 miles, with a mean breadth of 600 miles. Before the advent of the white man, and prior to the general destruction of forests, mosses, and lichens, by fire, the Nasquapees were a numerous people, feeding on the reindeer and rabbit, which were everywhere abundant, and on the porcupine, which was formerly very common on the south flank of the table-land.

VI.—*Notes on the Mountains and Glaciers of the Canterbury Province, New Zealand.* By DR. JULIUS HAAST, M.D., F.G.S.

Read, February 8, 1864.

IN looking at a map of New Zealand (see p. 56) we observe that a longitudinal mountain-chain of great magnitude, forming the watershed of the island, runs from north-east to south-west, the continuity of this chain being broken through only in very few places, otherwise presenting high and abrupt walls of great altitude through its whole length.

This backbone, as it has sometimes not inappropriately been called, begins at the south-western end of the Middle Island, and continues to the east cape of the Northern Island, broken through by Cook's Straits, and by a few rivers flowing through lateral and oblique fissures. It would make this memoir far too long, were I to enter into more details concerning the remarkable features of this magnificent chain throughout both islands, and I shall therefore treat of that portion only which occurs in the province of Canterbury.

It reaches its greatest altitude in this province, where, clad in a garment of dazzling snow, from which enormous glaciers descend, it presents us with such wild and fantastic forms, that it has with justice been named the Southern Alps. Beginning at Mount